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TRANSACTIONS
— OF THE —
AMERICAN
FISHERIES
SOCIETY



MARCH, 1918

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at Columbus, Ohio

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The American Fisheries Society

Organized 1870

Incorporated 1910

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TRANSACTIONS
of the
American Fisheries Society

"To promote the cause of fish culture; to gather and diffuse information bearing upon its practical success, and upon all matters relating to the fisheries; to unite and encourage all interests of fish culture and the fisheries; and to treat all questions of a scientific and economic character regarding fish."

VOLUME XLVII NUMBER 2
1917-1918

Edited by Raymond C. Osburn

MARCH, 1918

Published Quarterly by the Society
COLUMBUS, OHIO

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PROCEEDINGS
of the
Forty-Seventh Annual Meeting
of the
American Fisheries Society

ST. PAUL, MINN.,
August 29, 30 and 31, 1917

Opening Session*, Afternoon, August 29th.

The meeting was called to order by the President, Dr. George W. Field, who presided throughout the sessions.

REPORT OF THE RECORDING SECRETARY.

Mr. Carlos Avery, of St. Paul, Minn., Recording Secretary, submitted as his report the Proceedings of the Forty-sixth Annual Meeting held at New Orleans, La., as published in the June, 1917, number of the TRANSACTIONS.

It was moved and carried that the report be accepted.

REPORT OF THE TREASURER.

The report was read by Secretary Avery, who prefaced the reading by the statement that, following the death of Mr. Chas. W. Willard, who had acted as Treasurer since 1900, Miss L. B. Rimbach, of Medford Hillside, Mass., was made Acting Treasurer. Miss Rimbach's report covers the period from the annual meeting of 1916 to August 11, 1917, and is as follows:

* On the morning of the twenty-ninth the Society met with the National Association of Fish and Game Commissioners, at which time addresses of welcome were presented by the Governor of Minnesota and the Mayor of St. Paul.

To The American Fisheries Society:

I herewith submit my annual report as Acting Treasurer from the meeting in October, 1916, to the 11th of August, 1917.

RECEIPTS.

Sale of Transactions.....	\$ 113.09
Interest on deposits and fees for collection on checks received from members.....	6.28
Annual dues:	
For year 1912.....	\$ 4.00
For year 1913.....	4.00
For year 1914.....	40.00
For year 1915.....	73.00
For year 1916.....	710.00
For year 1917.....	566.00
For year 1918.....	10.00
For year 1919.....	2.00
Total dues collected.....	\$1,409.00
Total.....	\$1,528.37

DISBURSEMENTS.

Per Cash Book:

1916			
At Oct. meeting, Rexford L. Holmes, on account of bill for reporting.....		\$25.00	
Dec. 5	Postage stamps (Voucher 1).....	1.00	
19	Express on package from C. W. Willard Co.....	.45	
1917			
Jan. 11	Postage stamps (Voucher 2).....	2.00	
11	Cash book.....	.50	
15	Rexford L. Holmes (on account).....	50.00	
16	Stamped envelopes (Voucher 3).....	21.00	
16	Rubber Stamp (Voucher 4).....	.65	
17	Rubber stamp (Voucher 5).....	.30	
Feb. 2	M. Riddell (mimeographing and addressing).....	7.88	
12	Rexford L. Holmes (balance on bill Voucher 7).....	75.00	
21	Clark & Fritts, Sept. Trans. (Voucher 8).....	107.41	
	Exchange on January checks.....	.10	
	Exchange on February checks.....	.50	
April 2	The Leader Prtg. Co., (letterheads) (Vouch. 9).....	19.58	
7	Exchange on March checks.....	.20	
May 1	Estate of C. W. Willard, (Voucher 10).....	187.71	
1	Exchange on April checks.....	.20	
4	Stamped envelopes (Voucher 11).....	4.30	
5	Clark & Fritts Dec. Trans. (Voucher 12).....	167.84	
16	Stamped envelopes (Voucher 13).....	6.44	
18	J. C. Hall Co., Receipts for 1918 (Voucher 14).....	5.08	
22	Clark & Fritts Mar. Trans. (Voucher 15).....	149.59	
24	M. Riddell, Circulars (Voucher 16).....	3.00	
	Exch. May checks, 10c.; June, 10c.; July 20c.....	.40	
July 23	Leader Printing Co., printing.....	22.00	
			\$64.13
	Balance per Cash Book.....		\$664.24

L. B. RIMBACH,

Medford Hillside, Mass., Aug. 11, 1917.

Acting Treasurer.

REPORT ON PERMANENT FUND.

To the American Fisheries Society:

In regard to the Permanent Fund of the Society I have to report that this still remains on deposit with the Industrial Trust Co. of Westerly, R. I., and that since the report made by Mr. C. W. Willard at the meeting of the Society in October, 1916, there have been no deposits in or withdrawals from this fund.

Mr. Willard's last report showed a balance on October 9, 1916, of \$2,799.56.

L. B. RIMBACH,

Acting Treasurer.

Medford Hillside, Mass., Aug. 11, 1917.

Moved and carried that the report of the Treasurer be referred to the Auditing Committee for the usual verification of the accounts.

President Field announced the appointment of the following Committees:

Auditing Committee: Messrs. F. A. Tulian and Geo. H. Graham.

Committee on Resolutions: Messrs. W. A. Killian (chairman), E. A. Hinshaw, J. H. Kirk, E. G. Bradford, J. Q. Ward, Wm. E. Barber, and H. B. Ward.

Committee on Nominations: Messrs. J. W. Titcomb (chairman), John P. Woods, M. L. Alexander, J. Q. Ward, Seymour Bower, Eben W. Cobb, and H. S. Hedrick.

Committee on Time and Place of Meeting: Messrs. A. L. Millett (chairman), John M. Crampton, Theo. Roualt, A. Eastgate, D. G. Beauchamp, Linus Leavens and Henry O'Malley.

Committee on Publication: Messrs. R. C. Osburn (chairman), Bashford Dean and John T. Nichols.

Committee on Membership: Messrs. John W. Titcomb (chairman), Seymour Bower, Eben W. Cobb, S. P. Wires and S. P. Bartlett.

Committee on Program: Henry B. Ward and Henry O'Malley.

In announcing the Membership Committee, President Field called attention to the importance of increasing the membership. "There has never been a time in the history of the nation or of the world when constructive work on fisheries in the laboratories and

hatcheries, with county and state commissioners, state legislatures, Congress and the Bureau of Fisheries, has been so much needed. It will be the duty of the Membership Committee to canvas the situation, to interest all the newcomers and to encourage any past members who have dropped out to renew their membership. But in addition to this every member of the Society should constitute himself a membership committee of one to see that his friends and associates are informed as to the work of this Society and their support and interest secured."

Mr. E. A. Tulian, of Louisiana, was elected Acting Treasurer to serve during the meeting.

ELECTION OF NEW MEMBERS.

A list of applications was presented and, upon vote of the Society, the following members were declared elected to membership:

Honorary Member.

HONORE MERCIER, Minister of Colonization, Mines and Fisheries, Quebec, Canada.

Life Member.

GEORGE D. PRATT, Conservation Commissioner of New York, Albany, N. Y.

Active Members.

ACKERKNECHT, CHAS. H., 872 Selby Ave., St. Paul, Minn.
AINSWORTH, G. G., Manchester, Iowa.
ALLEN, CLARENCE J., Box 738, Milwaukee, Wis.
ANDERSON, DR. F. E., Red Wing, Minn.
ANNIN, H. E., Margaretville, Del. Co., N. Y.
BARNEY, RAYMOND L., Homer, Minn.
BEAUCHAMP, D. C., Game and Fish Commissioner, Paragould, Ark.
BLAIR, FRANK D., Excelsior, Minn.
BLOOM, J. H., Game and Fish Commissioner, Devils Lake, N. Dak.
BROWER, J. F., Fish and Game Commission, Holmesburg, Pa.
BURKE, WM. H., Old Forge, N. Y.
BURKHART, JOE, Lewis, Wis.
CALDWELL, F. M., 2311 Carter Ave., St. Paul, Minn.
CANFIELD, H. L., Fairport, Iowa.
CHAMBERLAIN, W. R., Game Warden, Wabasha, Minn.
CHAMBERS, E. T. D., Dept. Colonization, Mines and Fisheries, Quebec, Canada.
CLEASBY, E. A., 900 Camerson St., Eau Claire, Wis.
COOK, WARD A., U. S. Bureau of Fisheries, Duluth, Minn.
COWDEN, S. M., Conservation Commission, Albany, N. Y.
CRESS, H. A., Booth Fisheries Company, St. Paul, Minn.
CURRAN, JOHN L., Commissioner of Inland Fisheries, 602 Grosvenor Bldg., Providence, R. I.
DAVIDSON, HENRY, Fish Hatchery, Bath, N. Y.
DESAUTELS, H. E., Cedar Island Lodge, Brule, Wis.
DUNN, ANDREW C., Northern Fish Co., Duluth, Minn.

EASTGATE, ALFRED, St. John, N. Dakota.
ERICKSON, C. J., 328 Washington St., Boston, Mass.
FARRINGTON, RAY G., Ortonville, Minn.
FISHER, A. K., U. S. Biological Survey, Washington, D. C.
FITZGERALD, E. J., Minneiska, Wis.
GIBB, C. D., Game Warden, Wilder, Minn.
GORHAM, W. B., Brook Trout Co., Hudson, Wis.
GREEN, J. C., 4730 London Road, Duluth, Minn.
GUNTHER, F. E., 420 S. 5th Street, LaCrosse, Wis.
HILL, HOWARD RICE, 1108 W. Illinois St., Urbana, Ill.
JOHNSTON, J. W., Box 578, Rochester, N. Y.
JENSEN, HAROLD, State Fish Hatchery, St. Paul, Minn.
KEYES, H. W., Ranier, Minn.
KILLIAN, WM. H., 572 Munsey Bldg., Baltimore, Md.
KIRK, J. H., State Fish and Game Commission, Bottineau, N. Dak.
KOMOLL, C. F., Dundas, Minn.
LAU, H. C., Star Prairie, Wis.
LAWYER, GEO. A., U. S. Biological Survey, Washington, D. C.
LEAVENS, LINUS, Fish and Game Commission, Cambridge, Vt.
LEOPOLD, ALDO, Forest Service, Albuquerque, N. Mex.
MACLACHLAN, DR. CHAS., President Game and Fish Board, New Rockford, North Dakota.
MACK, JOHN E., Carson City, Nev.
MILLER, ALBERT P., Constantia, N. Y.
MILLER, DAN E., Constantia, N. Y.
MONKER, C. C., Grand Marais, Minn.
NELSON, J. O., Glenwood, Minn.
O'BRIEN, J. P., Box 1, Reno, Nevada.
OTIS, MILO F., State Fish Hatchery, Upper Saranac, N. Y.
PACKER, ARTHUR, 423 Plymouth Bldg., Minneapolis, Minn.
PINKERTON, J. A., Glenwood, Minn.
RASMUSSEN, DR. A. T., LaCrosse, Wis.
REYNOLDS, O. J., Game Warden, Alexandria, Minn.
RIGHTMAN, S. P., Fountain City, Wis.
RISLEY, A. F., State Fish Hatchery, Linlithgo, N. Y.
ROUALT, THEO., JR., State Game Warden, Santa Fe, N. Mex.
SEIZ, B. F., Deputy Game Warden, Red Wing, Minn.
SELVOG, HANS R., Warroad, Minn.
SMITH, G. A., Commissioner of Fisheries, Oklahoma City, Okla.
SPORTSMENS REVIEW PUBLISHING Co., 15 W. 6th St., Cincinnati, Ohio.
WARD, ROBERTSON S., 172 Harrison St., East Orange, N. J.
WATTS, A. E., 9 T. Wharf, Boston, Mass.
WELSCH, H. N., Box 4, Salt Lake City, Utah.
WILLIAMS, J. A., State Board of Health Bldg., Tampa, Florida.

Mr. John W. Titcomb called for an explanation of the Permanent Fund of the Society, and Prof. Henry B. Ward stated that it resulted from the fifty dollars contributed by each of the Patrons of the Society, of whom there are fifty-three. Only the interest of the fund derived from this source may be used.

Mr. Titcomb also brought up the question of publishing the index to the first forty volumes of the TRANSACTIONS, prepared by Mr. Daniel B. Fearing, but no action was taken.

On motion by Mr. John P. Woods the Session adjourned.

Wednesday Evening Session, August 29th.

The American Fisheries Society met in joint session with the National Association of Fish and Game Commissioners, as the guests of the Local Committee. A series of moving pictures, showing the winter elk range in the Jackson's Hole country, Wyoming, was presented by Mr. Norman McClintock and explained by him.

Mr. McClintock stated that the pictures were made by assistance from Hon. George Shiras, 3d, of Washington, D. C., and the United States Biological Survey. The photographs were taken with a telophoto lens and a series made by the ordinary method was shown to indicate the difference. The Jackson's Hole game refuge was visited in February and involved a trip over the Teton mountain range by sled from the railway terminus at Victory, Wyoming, over six feet or more of snow. The elk were shown, more than 3500 in one herd, at the winter feeding grounds where hay is provided to keep them from starving to death.

Other reels shown by Mr. McClintock illustrated a herd of 500 antelope in the Yellowstone National Park; also mule deer, mountain sheep and the peculiar little aquatic bird known as the water ouzel.

Hon. M. L. Alexander introduced Mr. Stanley C. Arthur, ornithologist of the Department of Conservation of Louisiana, who presented a series of pictures illustrating ducks and geese in winter time in Louisiana. Gulls were also shown on the reserves, which are under the protection of the Federal Government and the Audobon Society, in co-operation with the State of Louisiana.

Mr. Alexander also introduced Mr. Marshall McLean, of the New York Conservation Commission, who explained a series of pictures showing the work of the Commission. These reels were made to familiarize the people of New York State with the operations of the different branches of the State Commission. The purpose of this, Mr. McLean explained was to educate the people in conservation, in order that the Commission might have the full support and sympathy of all classes of the people.

The evening session was then adjourned.

Thursday Morning Session, August 30th.

PRESIDENTIAL ADDRESS.

BY DR. GEORGE W. FIELD.

It has been my good fortune to spend the past three months in Colorado, Oregon, Montana and Wyoming, and I have been impressed with the importance of the development of fisheries work in that section of the country. Everywhere, all over the country, the importance of fisheries as a national problem is increasing very rapidly. The general utilization of fish as food, fertilizer and oil is at present handicapped, among other things, by a lack of individual responsibility, by divided or even entire absence of legal authority, by selfishness on the part of individuals and by lack of knowledge and foresight. This results in enormous wastage in all directions.

Have you considered how many fish are thoughtlessly killed by anglers (not sportsmen) who catch a large number of fish and fail to utilize them? The aggregate is astounding. It is a small matter for a party to go out and catch a dozen, thirty, fifty or more fish of various kinds which are edible, but how many of these are left unused and forgotten in the boats or otherwise wasted? On both the west and east coasts and to a certain extent in the rivers, a very large number of fish below the market size are caught and killed. This particularly occurs on the New England coast where the fishermen still make a business of catching small mackerel, pollock and other smaller fish, counting about 900 to the barrel. They get on the market forty cents to a dollar for those 900 fish. If these were allowed to grow to maturity they could get from twenty-five to thirty-five or forty cents apiece for them. We have made some rough computations and found that forty cents worth of such small fish, in one year, possibly, or in two at the outside, might amount to \$280.00 worth of food by natural growth, after allowing for a decrease of 50% in numbers. But more than that, under this unwise method of catching schools of small fish by traps and seines, a very large proportion of these are thrown overboard as of no market value.

Reforms of this kind which affect the pocketbooks of fishermen are difficult to bring about, but they are exceedingly important in

the general economy of the nation. I believe that the conditions that obtain now, when the people are going to look into these practices on account of the necessities of war, will make very largely for improvement.

We found, as a general proposition, that in the fisheries business as conducted in a great many places, at least 40% of the total product is wasted; never gets to market, never utilized for food, never turned into cash in any way, shape or fashion. Now I do not know of any greater arraignment of any industry than to say that there is a 40% waste. What would it mean to the country and to the world if there were that waste in the grain trade or in the handling of meat supplies. It is a national disgrace that such a condition obtains anywhere in the United States.

There is also an enormous curtailment of the fish supply and particularly of the breeding grounds. This comes about through the introduction of sewage into public waters. Factory wastes entail an enormous loss, not alone to the fish, but particularly to the industries themselves. I have had a recent report of one of our rivers which was formerly an important salmon and shad river and could be utilized for many other species of fish. That river, the Merrimac, was practically wiped off the fishermen's map on account of the pollution by factory and municipal sewage. The report states that the factories, particularly the woolen factories, are equipping their mills with devices for saving wool scouring wastes. Already there has been a very marked improvement in that river and we may look in the near future to its becoming again a source of food and recreation to the people. Now that must be done ultimately in practically every large river of the country. One cannot traverse any of the large rivers without noticing a large amount of waste going on unnecessarily. This is true, not alone of the rivers of the east where the condition has grown worse through years of malpractice, but the rivers of the central part of the country and of the west are rapidly getting into that condition.

I was astounded at the changes made in the rivers by mining operations in Nevada, Northern California and Oregon. Some of this can be avoided. Lumbering operations, too, throw enormous amounts of useful waste into the streams because up to the present time we have not been obliged to utilize those types of materials.

There is another chance to make an enormous saving of fish life in our irrigation operations. You are all familiar with the fact that when the gates of the irrigation systems are opened enormous quantities of fish of all sizes go into the ditches and as the water dries up the fish, of course, are left there and wasted. Every state which has irrigation projects within its borders should be compelled by public sentiment to utilize those fish in some way. By systematic collections they could be used for stocking ponds or rivers and then, occasionally, the best of the fish might be put on the market. Those which are below market size should be put in ponds for future use. A systematic collection would be relatively easy if wells or pockets could be constructed, so that as these irrigation ditches dry up, the fish would gradually collect in these deep places where they could be systematically handled.

In regard to the fish screen, it is still necessary to find some practical, usable, non-clogging screen and to educate the people to its use. I know from personal contact with the authorities of the United States Reclamation Service, that they stand ready to forward any well-devised movement in that line.

The salvage of fish from overflow of rivers has been in operation to some extent in parts of the country, but there is still much waste where this important opportunity is neglected. It has been carried on by the Bureau of Fisheries and by some states for a number of years, but must be extended to other localities. It is important also, that advanced steps should be taken relative to the methods and the necessity of developing and utilizing the full producing powers of public and privately owned waters, not as a temporary, but as a permanent source of food and recreation.

The state universities should be called upon by the people to give more extended instruction in aquatic biology and in related chemistry and physics and in all problems involved in the complete utilization of the water and of the fish for food and recreation, and should closely scrutinize existing and proposed laws to eliminate biological blunders. At various times this has been urged by Dr. Smith, the U. S. Commissioner of Fisheries, and some of the state universities are already working on these lines, but there must be a wide extension.

One of the most important applications of biology and of science, I believe, is in educating the legislatures as to the import-

ance of these things. They should be encouraged to promote more extensive development of fish cultural operations, both in public waters by special concessions and particularly in private waters under beneficial laws by public and private capital. It is possible in many projects, where the waters are now used for the irrigating of land, to interpolate ponds in these irrigation systems where the water could be used for rearing fish and then passed on from the fish ponds into the ditches to irrigate the land in the usual manner. The person who may wish to develop ponds frequently cannot afford to put in a permanent and satisfactory water supply at his own expense, but the great reservoirs of the United States Reclamation Service might in many cases be utilized, after the requisite legislation has been enacted and the proper regulations made for supplying fish ponds. It would mean a tremendous extension of the wise utilization of this water for producing food. In the case of the irrigation projects, this double utilization of water would mean an additional source of income, as the owner of the fish pond could afford, as well as the person irrigating the land, to pay a reasonable sum for the use of the water.

Improved methods of distribution and marketing fish are still imperatively necessary, in spite of the fact that great progress has been made in the past five years. Enormous quantities of shrimp, lobsters and crabs, among the shell-fish, and of all species of fish, are still wasted. Of this you need no better evidence than can be found in any of the fish markets in the large cities. Even within twenty-four hours of the mouth of the Columbia River, I was warned that it was positively dangerous to eat fish on any day except Friday or Saturday, for the reason that the supply came in only on Thursday night. On Friday and Saturday it was safe, but after that there was positive danger of ptomaine poisoning. That is within twenty-four hours of the supply of a main original source of salmon, halibut and Pacific cod; and more than that, it is in the center of an area abounding in mountain streams and extensive lakes.

It is perhaps unnecessary at this point to speak of the importance of state and federal hatcheries and rearing ponds on public waters. There should be an extension of methods of practice of caring for the ripe fish caught for market both on the lakes and on

the Pacific and Atlantic coasts. There should be increased utilization of the fish wastes.

I believe the most important biological problem of the nation today is the destructive effect of immense drainage projects carried out at the instigation of petty lawyers and promoters seeking to make profit for themselves. They are entirely neglectful of the great damage resulting from the enormous amount of flood water which is turned into the streams prematurely by draining swamps and lakes in addition to the normal run off. Much of the benefit arising thus from the extension of agricultural areas is negated by the destruction wrought by flood or drought. Unwise drainage operations may even tend to hasten the progressive drying up of the continent.

It is estimated that the annual loss from floods in the Mississippi Valley alone averages over \$50,000,000.00. It does not require a very large area of land to produce that amount in wheat and there is no reason why we should not develop that land for wheat production and at the same time, by wise selection of the area to be drained, safeguard the inhabitants on the lower river. But because of the lack of co-ordination in the development of these projects in the past we have, so to speak, robbed Peter to pay Paul.

These questions cannot be settled by the United States alone. We are joined in ties of friendship and brotherhood with our neighbors on the north, Canada, and on the south, Mexico. The evidence of these ties is much stronger at present at the north than at the south, but we cannot help feeling that ultimately, conditions will become adjusted both north and south to greatly benefit the entire continent.

President Field then introduced Hon. Honore Mercier, Minister of Colonization, Mines and Fisheries of the Province of Quebec, who spoke briefly as follows:

"Mr. President: As I have no special subject assigned to me I will refer briefly to the fisheries with which I am best acquainted, those of the Province of Quebec. These may be divided into two classes, the inland and the coastal fisheries. The control is also divided, the Dominion framing the laws regulating closed seasons

and the methods by which fishes may be taken, while the enforcement of the laws belongs largely to the province.

At present there is a dispute between the Federal Government and the Province of Quebec as to whether or not the Dominion has absolute control of fisheries in tidal waters, but by mutual consent the interpretation of the constitution on this question has been left to the courts, with the understanding that the case will go to the highest court of the empire, the Imperial Privy Council, for a definite decision.

Our sole control of the inland waters is unquestioned. No less than ten million acres of our territory are covered with water. We have thousands of lakes, large and small, some of them hundreds of square miles in extent. Many are richly stocked with the largest and gamest specimens of brook trout and others contain lake trout or black bass. Our salmon rivers are in a class by themselves. They flow for the most part into the lower St. Lawrence and the Baie des Chaleurs. The entire St. Lawrence River, from the Ontario boundary down to the Gulf, is in the Province of Quebec and upwards of a hundred and thirty rivers, large and small, flow into it. It has been estimated that our coastal fisheries cover approximately 4,500 miles of coastline along the two shores of the St. Lawrence and the Gulf, the north shore of the Baie des Chaleurs, the eastern shore of Hudson and James Bays and the entire shore line of Ungava Bay. In the St. Lawrence River we have also the lakes St. Francis, St. Louis, Two Mountains and St. Peter.

The Federal Government operated all the fish hatcheries of Quebec Province up to two years ago, when it abandoned four of the inland ones. Our province accepted a transfer of these and assumed their cost."

Mr. E. T. D. Chambers of Quebec, in charge of the fish hatcheries of the province, Secretary of the North American Fish and Game Protective Association, and well known as an author on Canadian fishes, was introduced and responded with a brief address.

"No one could listen to the presidential address this morning without appreciating how many sided is this question of North American fisheries, their commercial value and the large contribu-

tion they make to the food supply of the world. This contribution was never more important than at the present time when the people of both our countries here are looking toward this food supply and when we wish to contribute largely to the supply of food for our Allies in Europe. From whatever angle we view the fisheries of North America we cannot fail to be interested.

We have been taught to believe that our progenitors in this country came here simply in search of liberty and that the early French explorers were actuated by the desire to start a new civilization. However, as I read history, I find that the stories of the great wealth of the fisheries brought out large numbers of the earliest pioneers and that the keen perception of the statesmen of France resulted in a great merchant marine based upon the trade in this branch of commerce.

The early French governors of Canada were led to insist upon the development of the fisheries, and to encourage them by state assistance and so very few concessions were granted. One of the concessions that were given was granted to no less a person than the great explorer Joliet.

It was only natural that rivalries should spring up between the fishermen of these new countries that led to some little misunderstandings, but I am proud to say that for more than a hundred years all such questions and disputes have been settled by treaty. May we not hope that before long the work undertaken by Professor David Starr Jordan, representing the United States, and Professor E. E. Prince, of the Dominion of Canada, will result in putting into effect the best, if not all, the recommendations they have made concerning the international fisheries of our countries."

The session adjourned for a few minutes to permit the Association of Fish and Game Commissioners to complete certain business, whereupon the Society again resumed work.

REPORT OF THE COMMITTEE ON TIME AND PLACE
OF MEETING.

Mr. A. L. Millett, chairman, presented the report, stating that the committee had decided unanimously to meet at some point in the State of New York, and the date selected to be sometime in the week of September 11, 1918.

Mr. John P. Woods moved the adoption of the report, which was unanimously carried.

Mr. John W. Titcomb, Chairman of the Committee on Membership, presented the name of Hon. Honore Mercier for election as an honorary member of the Society. President Field called for a rising vote which was declared to be unanimous.

The next speaker to be introduced by the President was Hon. W. A. Killian, State Commissioner of Fisheries of Maryland. An abstract of Mr. Killian's remarks follows:

HON. W. A. KILLIAN'S ADDRESS.

"I have often wondered why the fisherman of any region have so devastated their source of livelihood, but perhaps the suggestion that it goes back to the Pilgrim Fathers and to misconceived ideas of the right of free fisheries, is correct. But it is wonderful what the conservation idea can do in a community when the logical consequences of waste and the fact that their livelihood has been destroyed is brought home to the fishermen themselves.

One of the first things recognized when the Maryland Conservation Commission was created—and I take it the same has been true in other states—is that very little can be accomplished until there is real co-operation between the states which have common interests. It was a by-word for years that no co-operation could be expected between Maryland and Virginia and one of the largest industries of these states, namely the oyster industry, had gone wrong, merely because the Potomac River forms the boundary line. The crab and fish industries also suffered greatly for the same reason. Fortunately, it was possible to arrive at an understanding. I wish to say for your encouragement that if the commissions of any two states will get together and cut red tape and form a joint partnership for handling the work they can get somewhere. That is what we have done and when we get together on the boundary line we have present all those who are charged with any part of the work. While we have had only one year of such co-operative work, enormous benefits are already apparent.

It is much easier to secure respect for law if the people appreciate the benefits to be derived. We have recently devised a plan

to reach the people directly by sending out a small leaflet to each person concerned, whose name we can secure, and we hope to at least afford them a knowledge of what legislation is proposed and when it becomes a law.

The blue crab, which is a very valuable product, was rapidly disappearing and it was difficult to secure the enforcement of legislation on account of "county exemptions" and the failure of some local justices to do their duty. But county exemptions are now prevented by law and delinquent justices were advised that unless they construed the law in accordance with its new interpretations they would be invited before a grand jury, so we have had no more trouble.

We do not hesitate to arrest a citizen of Virginia, because our laws are similar, and if the police of either state apprehend a violator, he is taken before a justice of the state in which he is a citizen. In one instance a Virginia oyster man attempted to land a considerable cargo of undersized oysters in Maryland. He was told that he could not land illegal oysters, but must cull them. This was a big job, but after he had culled them we permitted him to land the big ones. Then we took him to Virginia where he was fined a considerable sum and was made to return the small oysters to the beds. That was only necessary once last year.

Another law, recently passed, deals with the pollution of streams and tidal waters, which provides not only for a fine, but also for imprisonment for one to three years. We do not intend to be too drastic in its enforcement and we propose to send a copy of the law to every factory, large or small, asking every one to study his own problem and to eliminate harmful waste. I fully believe that if we could get the intelligent co-operation of those industries that are discharging harmful wastes into the waters, we should soon get back to the basis of greater food production."

Mr. Wm. C. Barber, of Wisconsin, in discussing the foregoing address, related a number of cases in which local justices had made improper rulings in sympathy with the offenders until warned of malfeasance. Juries also had to be warned that would be arrested for perjury unless they found in accordance with the evidence and the law.

President Field also cited a case where fishermen, who were prevented from selling polluted quahog clams in Massachusetts, petitioned to be allowed to ship them to New York. It was practically impossible for the state authorities to prevent this, but federal officers were notified and intervened. If these facts were known, that the federal authorities are now in a position to deal with interstate commerce on forbidden goods of whatever sort, a very great influence could be brought to bear to prevent such violations.

The next address, "Importance of a Permanent Policy in Stocking Inland Waters," by Mr. John W. Titcomb, State Fish Culturist of New York, has already been printed in full in the December, 1917, number of the *TRANSACTIONS*, Vol. XLVII, pp. 11-21.

The session adjourned.

Afternoon and Evening of Thursday, August 30th.

The afternoon of the 30th was spent on an automobile tour as the guests of the clubs of the city. This terminated in the evening at the Automobile Club where dinner was served. At the close of the dinner the Society convened for an evening session.

Mr. Harold Harris, on behalf of the various clubs, acting as host of the occasion, made a brief address of welcome and called upon the following members, each of whom responded briefly:

Mr. Honore Mercier, Minister of Colonization, Mines and Fisheries of Quebec.

Mr. James White, Deputy Head of the Conservation Commission of Canada.

Mr. M. L. Alexander, President of the National Association of Fish and Game Commissioners and Conservation Commissioner of Louisiana.

Dr. Geo. W. Field, President of the American Fisheries Society.

Mr. Henry O'Malley, of the U. S. Bureau of Fisheries, Vice-President of the American Fisheries Society.

Prof. Henry B. Ward, of the University of Illinois.

Mr. John W. Titcomb, State Fish Culturist of New York.

Judge J. H. Kirk, State Fish and Game Commissioner of North Dakota.

Mr. F. Brash, Chief Game Warden, Saskatchewan, Canada.

Mr. G. A. Smith, State Fish Commissioner, of Oklahoma.

Mr. Geo. H. Graham, Fish and Game Commissioner of Massachusetts.

Mr. John M. Crampton, Superintendent of Fish and Game of Connecticut.

Mr. Carlos Avery, Fish and Game Commissioner of Minnesota and Secretary of the American Fisheries Society.

Adjournment.

Friday Morning Session, August 31st.

President Field called the meeting to order and asked for the reports from the committees.

REPORT OF THE NOMINATING COMMITTEE.

Mr. John P. Woods presented the report, in which the following were suggested for Officers of the Society for the year 1917-18:

<i>President</i>	MR. HENRY O'MALLEY
<i>Vice-President</i>	MR. M. L. ALEXANDER
<i>Recording Secretary</i>	MR. JOHN W. TITCOMB
<i>Treasurer</i>	MR. A. L. MILLETT
<i>Editor</i>	PROF. RAYMOND C. OSBURN

Vice-Presidents of Divisions

Fish Culture.....	DWIGHT LYDELL, Comstock Park, Mich.
Aquatic Biology and Physics...	HENRY B. WARD, Urbana, Ill.
Commercial Fishing.....	J. F. MOSER, Alameda, Cal.
Angling	DANIEL B. FEARING, Newport, R. I.
Protection and Legislation,	GEO. A. LAWYER, Washington, D. C.

Executive Committee.

CARLOS AVERY, <i>Chairman</i>	St. Paul, Minn.
JOHN P. WOODS.....	St. Louis, Mo.
JOHN S. PARSONS.....	Accomac, Va.
C. O. HAYFORD.....	Hackettstown, N. J.
J. Q. WARD.....	Frankfort, Ky.
W. H. KILLIAN.....	Baltimore, Md.
CARL WESTERFELD.....	San Francisco, Cal.

Committee on Foreign Relations.

GEORGE SHIRAS, 3D, <i>Chairman</i>	Washington, D. C.
HUGH M. SMITH.....	Washington, D. C.
W. W. BARBER.....	Madison, Wis.
JAMES WHITE.....	Ottawa, Canada.
CHAS. H. WILSON.....	Glen Falls, N. Y.

Committee on Relations with National and State Governments.

JACOB REIGHARD, <i>Chairman</i>	Ann Arbor, Mich.
WM. L. FINLEY.....	Portland, Ore.
WM. C. ADAMS.....	Boston, Mass.
E. W. NELSON.....	Washington, D. C.
E. T. D. CHAMBERS.....	Quebec, Canada

Publication Committee.

RAYMOND C. OSBURN, <i>Chairman</i>	Columbus, Ohio
BASHFORD DEAN.....	New York, N. Y.
JOHN T. NICHOLS.....	New York, N. Y.

It was moved and carried that the Secretary cast one ballot for the officers named.

COMMITTEE ON FOREIGN RELATIONS.

No formal report was presented, but Hon. George Shiras 3rd, Chairman, outlined some of the problems which had come before the committee for discussion. One of these was the question of Federal control of migratory fishes on a similar basis to the migratory bird law. Also the question of government control of tidal, interstate and international waters, and the proposition to extend the three mile limit to twenty miles with control of the fisheries

over that area. Some of the difficulties and possibilities of legislation along these lines were suggested in order to acquaint the Society with the work with which the committee is engaged and on which it intends to report later.

COMMITTEE ON AMALGAMATION OF THE AMERICAN FISHERIES SOCIETY AND THE PACIFIC COAST FISHERIES SOCIETY.

Mr. Henry O'Malley, Chairman, reminded the Society that his committee was appointed at the San Francisco meeting in 1915 to consider the amalgamation of these societies and that the By-laws of the American Fisheries Society were changed at the time to provide for branches. He reported that the Chairman of the Executive Committee of the Pacific Coast Fisheries Society informed him that at their meeting, held in July, 1917, it was unanimously voted to join hands with the American Fisheries Society. He further stated that all that remains to be done is to get in touch with the proper officers of the Pacific Coast Society and the amalgamation may be properly concluded at the next annual meeting, and suggested that a committee be appointed to take charge of the matter.

Mr. John P. Woods moved that the present committee be continued to complete the arrangements and the motion was unanimously carried.

REPORT OF THE AUDITING COMMITTEE.

Mr. Geo. H. Graham, Chairman, reported that the Auditing Committee had examined the Treasurer's account and found it to be correct and accompanied by the proper vouchers.

A motion that the report be adopted was put and carried.

Discussion of Mr. Titcomb's Paper.

The address presented by Mr. John W. Titcomb on the previous day was then taken up for discussion, (See TRANSACTIONS, December, 1917, pp. 11-21, where this paper appears in full), and Mr. Titcomb first gave a resume of the paper.

Mr. Wm. E. Barber, of Wisconsin, stated that as an emergency measure the Wisconsin Commission in 1917 was ordered to oversee the distribution of rough fish within the state boundaries.

These were marketed at five cents a pound. Carp were distributed in eight different places and in Milwaukee 36,000 pounds a month were taken. He stated also that the Wisconsin fish and game laws had been codified, resulting in more uniformity.

Mr. John M. Crampton, of Connecticut, called attention to the pollution of waters and cited a number of very flagrant cases of pollution resulting in the death of fish in the State of Connecticut.

President Field stated that the ordinary game laws lack elasticity in meeting the situation. With the improved personnel in the boards of commissioners, they should be given greater responsibility and allowed to make regulations to meet existing conditions as they rapidly change, since it often happens that before a law can be passed and enforced the condition has passed beyond all remedy.

Mr. Geo. H. Graham, of Massachusetts, deplored the fact that changing political conditions bring about changes in the state commissions and make for changes in policy. If there is any possible way by which a permanent policy can be arranged for, it should be established. The indiscriminate stocking of waters is a great evil, because once obnoxious species are established, it is impossible to get rid of them. Mr. Graham mentioned numerous cases in New England where improper stocking had resulted in the production of undesirable fishes to the detriment of more desirable species.

Mr. Titcomb, continuing the discussion, stated that there are many lakes in which the trout fishing has been spoiled by the introduction of other fishes such as the bass, pickerel and carp. Where pickerel have come to stay, trout planting may as well be stopped and other food fishes like the perch introduced, which will feed the pickerel and also afford food for those who are not expert anglers. Where black bass have been introduced into New York and New England waters there is a general closed season on them covering the breeding period, though the bass do not thrive very well in these trout waters.

Mr. Titcomb recommended that the closed season be removed from the bass, thus reducing their numbers and also offered the suggestion that the bass nests be screened so that after hatching,

the young may be removed to other places where it is desired to propagate the bass. In a similar manner the perch eggs may be collected and all these measures tend to give the trout a better chance. The carp has been introduced into many New York waters that are not particularly suited to them, but the general fisheries laws protect them during the breeding season. If provision was made to permit taking them during the breeding season they would be valuable for food and at the same time their numbers would be reduced in favor of more desirable fishes which are better suited to these waters.

Fish Waste, Past and Present.

BY DR. S. P. BARTLETT,
U. S. Bureau of Fisheries, Quincy, Ill.

(For this paper, see TRANSACTIONS, Vol. XLVII, No. 1, Dec., 1917, pp. 22-27)

Professor Henry B. Ward, in discussion, called attention to the fact that the public are often misled into the belief that carp, bowfin and other cheaper fish are worthless as food, or are even dangerous, while as a matter of fact the choice between salmon or whitefish and carp has no bearing on the question of nutrition. One is as wholesome and nutritious as the other, yet many people have been prejudiced to the extent that, when they cannot afford to buy the higher priced fishes, they refuse to take any. Professor Ward praised the merits of smoked carp and bowfin and cited a demonstration by an expert in home economics which proved to a group of previously prejudiced women that these fishes when smoked are preferable to finnan haddie. Experts in fisheries matters especially should be careful, particularly in these days of high prices, that the public is made to understand that these cheaper fishes are as nutritious as any others and that they can be prepared in ways to make them highly desirable.

Mr. Carlos Avery, of Minnesota, mentioned the need in his state of a campaign of education on the edible qualities of the carp, especially in the fresh condition. Millions of pounds of carp are being shipped outside the state, but they are not being utilized at home as they should be.

Mr. John P. Woods, of Missouri, stated that the U. S. Bureau of Fisheries is glad to furnish recipes for cooking the various kinds

of fish. He mentioned the fact that he had served carp as "silver salmon" to a party of friends, all of whom thought it as good fish as they had ever eaten. The whole difficulty lies in prejudice.

Mr. John W. Titcomb, of New York, cited a similar illustration. At a meeting of the sportsmen and anglers of Vermont, at which a number of distinguished fisheries experts were present, carp was served under the disguise of "red snappers." The carp, with a recipe for cooking them, had been sent from Illinois by Dr. Bartlett. Some of the guests thought they were whitefish, others that they were pike-perch, but no one knew what he was eating and all enjoyed and praised the fish. He spoke also of serving smoked carp at a meeting of the conservation commission and all agreed that they preferred it to smoked halibut. He admitted that he had referred to carp in certain New York waters as "vermin," but did not wish to be misunderstood. There is a great demand for carp in New York City and many New York lakes are filled with these fish, but there is no provision for taking them except by angling and it would be better if several hundred thousand pounds could be removed annually and utilized.

Mr. Wm. E. Barber, of Wisconsin, explained how the state handled carp during the summer of 1917. The Council of Defense issued bulletins and distributed them generally to the mayors of cities and newspapers. Then 2,000 lbs. of carp were shipped to Milwaukee and sold out in less than an hour. Then 3,000 lbs. were disposed of in a half hour, then 5,000 lbs., after which they took all they could get. At Madison, Oshkosh and elsewhere, they soon became popular. Now the fishermen are allowed four cents a pound for the fish, the state adds another cent for expenses and the city another cent. This allows them to be sold at six cents a pound and it is believed that the state will take its whole output. The carp, living in muddy water, naturally have a muddy taste, but if they are cleaned and the skin removed, and are then soaked in salt water over night they will be as good fish as anyone could wish.

Professor Ward also insisted upon the advisability of skinning the carp before cooking and recalled his experience in Germany, where the carp command a higher price than trout because they are marketed alive and in this condition can regularly be bled when killed for cooking.

Mr. John L. Curran, of Rhode Island, called attention to the fact that carp are sold in Providence only in the Jewish markets. He stated further that shark meat has advanced in price on eastern markets, but both sharks and skates should be utilized to a much greater extent. The squid is scarcely utilized at all. The flounder and fluke are scarcely known on the markets except on the coast, though we all know their delicate qualities when, under the magic of the cook, they become "filet of sole."

Mr. Henry O'Malley, of the U. S. Bureau of Fisheries, stated that the Bureau is preparing a pamphlet on the carp, giving recipes for cooking and instructions for ridding it of any muddy flavor. He stated that over 500,000 lbs. of smoked carp, requiring 1,500,000 lbs. of fresh carp for the preparation, were marketed in New York City last year. The carp market of New York is one of the big fish centers of that city.

Discussion of Stream Pollution.

A paper on stream pollution by Mr. G. A. Smith, Commissioner of Fisheries of Oklahoma was called for, but owing to the absence of the author was not read. President Field suggested that the question should be discussed as a matter of record.

Mr. Geo. Shiras, 3d, of Washington, D. C., stated that the best way to secure action in cases of stream pollution is by interesting local health departments, after a careful study of conditions involving the economic side of the question. Many streams are little better than open sewers and the health authorities are the proper means for remedying this condition. Individuals owning land along a stream can sue anyone polluting the stream for the abatement of the nuisance. The state may take the lead in pollution cases, but in the case of very important mills or other plants, it is difficult to obtain action. But what is especially needed is general congressional action regarding interstate waters, for it is especially the larger streams in which it is most difficult to prevent pollution and many of these are interstate waters. The Supreme Court of the United States has already laid down the general principle that no state has reason to pollute the waters of another state. At present, however, the only redress is for the one state to bring continued legal action against the other, and what is

needed is congressional authority for an interstate waterways commission of scientific men capable of passing on the question of pollution.

The Difference Between Steel-head and Rainbow Trouts.

By Mr. W. M. Keil, of Tuxedo Park, N. Y.

In the absence of Mr. Keil his paper was read by title, but a series of drawings and X-ray photographs was shown.

The following papers were also read by title:

Trout Fishing near Winona and Manner of Stocking Streams.

By Mr. Earl Simpson, Winona, Minn.

Fisheries in the Mississippi Valley.

By Mr. D. C. Booth, of Homer, Minn.

Fisheries of the Upper Mississippi.

By Mr. M. N. Lipinski, of Winona, Minn.

Mr. Austin F. Shira, Director of the Fairport Biological Station of the U. S. Bureau of Fisheries, was then called upon for his paper on *Fish Cultural Activities of the Fairport Biological Station*. (This appears in the TRANSACTIONS for December, 1917, Vol. XLVII, No. 1, pp. 39-44.)

The morning session was then adjourned.

Friday Afternoon Session, August 31st.

Mr. Geo. A. Lawyer, of Washington, D. C., moved that the chair appoint a committee to formulate a statement of the essential principles relative to the conservation of fisheries resources. The motion was seconded and carried.

Experiments on the Re-stocking of Devils Lake, N. Dak.

By Mr. Alfred Eastgate, St. John, N. Dak.

On Sending Fishing Tackle to Our Brother Sportsman With the Allied Armies. By Mr. J. W. Johnston, Rochester, N. Y.

One of the problems which confronts those interested in the welfare of the soldiers of the Allied Armies is that of providing healthful recreation during their spare time. About the middle of June an article by Miss Clara Norton appeared in the *New York Times* suggesting that fishing tackle be supplied, and the British sportsmen, through the *Fly Fisher's Gazette*, have fathered such a movement in Great Britain. The tackle, consisting of rod, reel, line, hooks, etc., has been put up in packages and forwarded, usually through the Young Men's Christian Association. There are many sportsmen in the army and, if they can be provided with the means of spending an idle hour pleasantly, the influence will be very great, for the problem of recreation is a very important one.

If this movement is supported by such a body as the American Fisheries Society that fact will have its influence. (Abstracted.)

PRESIDENT FIELD: No doubt there are many of the members of this Society who will be glad to contribute tackle, or money to provide for it, and I see no reason why the Society as a whole should not indorse the movement.

MR. JOHN P. WOODS: I think we should support this measure, for while we may be scientists, naturalists and so forth, we also have good sporting blood in us.

PRESIDENT FIELD: I think that voices the sentiment of the whole Society.

The Mussel Beds and Fisheries of Louisiana

By Mr. E. A. Tulian, of New Orleans, La. Read by title.

The Eggs of Buffalo-fish.

By Mr. H. L. Canfield, Superintendent of Fish Culture, U. S. Biological Station, Fairport, Iowa.

Fish Farming.

By Mr. John P. Woods, Missouri State Fish Commissioner, St. Louis, Mo. Read by title.

Increasing the Output.

By Mr. W. O. Buck, U. S. Bureau of Fisheries, Neosho, Mo. Read by title.

REPORT OF COMMITTEE ON RESOLUTIONS.

Presented by Prof. Henry B. Ward.

I. *Resolved:* That the American Fisheries Society hereby expresses its thanks to the members of the Local Committee and the Clubs of St. Paul for the entertainment which has been provided during the meeting and which has made our visit one to be remembered.

II. *Resolved:* That the State Fisheries Authorities of Minnesota be assured of our obligation to them for their interest in this meeting of our Society; and

III. *Resolved:* That our special thanks are due to Commissioner Carlos Avery, who, as Secretary of this Society, has been largely responsible for the great success of this meeting.

These resolutions were adopted by vote of the Society.

Protection and Destruction of Food Fishes in the Great Lakes.

By Mr. S. W. Downing, U. S. Bureau of Fisheries, Put-in-Bay, Ohio.

This paper appears in full in the TRANSACTIONS for December, 1917, Vol. XLVII, No. 1, pp. 28-35.

A Hatchery Maintained by a Fish and Game Protective Association.

By Mr. C. H. Bower, of Columbus, Ohio. Read by title.

The Establishment of Fisheries Schools. By Dr. O. T. Olsen, Grimsby, England. Read by title.

The General Routine of a Trout Hatchery. By Mr. R. L. Ripley, Bayfield Fish Hatchery, Bayfield, Wis.

No discussion.

*Additional Notes on Rearing the Channel Catfish (*Ictalurus punctatus*).* By Mr. Austin F. Shira, Director, Fairport Biological Station, Fairport, Iowa.

This paper appears in full in the December, 1917, number of the TRANSACTIONS, Vol. XLVII, No. 1, pp. 45-47.

Improve the Canned Fish Product. By Mr. K. Hovden, Monterey, California. Read by title.

Mixing Trout in Western Waters. By Aldo Leopold, U. S. Forest Service, Albuquerque, New Mexico. Read by title.

Secretary Avery read letters from Dr. Chas. H. Townsend, Director of the New York Aquarium, from Dr. Raymond C. Osburn, the Editor of the Society and from Mr. N. R. Buller, Commissioner of Fisheries for Pennsylvania.

PRESIDENT FIELD: My last duty, before this annual meeting is brought to a close, is the appointment of the committee provided for by your action, as the result largely of the suggestions made in Mr. Titcomb's paper. This Society needs a creed and its creed should be in such form that it can be applied to specific cases both in Federal and State legislation. The committee to be named is to formulate a statement of the fundamental principles essential to legislative practice relative to the proper utilization of the fisheries resources of the United States. I will ask Mr. John W. Titcomb, of New York, to act as chairman, with Mr. Chas. O. Hayford, of New Jersey, and Dr. Chas. H. Townsend, Director of the New York Aquarium, and the incoming President, Mr. Henry O'Malley, of the United States Bureau of Fisheries, as a member *ex officio*.

Editor's Note.—The committee above named has drafted the following set of resolutions, which, although the Society has had no opportunity for formally approving them, are of such importance that they should be made public as soon as possible.

**REPORT OF COMMITTEE ON PRINCIPLES OF LEGISLATION RELATIVE
TO PROPER UTILIZATION OF FISHERIES RESOURCES.**

WHEREAS, Under the stress of present conditions the nation has been brought to look carefully into the character and the amount of its various food supplies; and,

WHEREAS, In the past it has, through lack of attention, failed to appreciate in any real sense the significance of its food fishes and the opportunities afforded by its numerous and varied water bodies to produce a large and important element for the food supply of the nation and,

WHEREAS, We, members of the American Fisheries Society, in session at the Forty-seventh Annual Meeting held at St. Paul, Minnesota, by virtue of our contact with the fishing industry and

knowledge of its problems and opportunities, being thus aware of the dangers in the situation and cognizant of the various lines in which the nation can be benefited at the present time, desire to record in formal manner those fundamental principles which appear to be essential to wise legislation and to effective work for the proper utilization of the fishing resources of the nation, and do accordingly express these views; and,

WHEREAS, Under the stress of war conditions expert advice and trained supervision is even more necessary than in ordinary times; and,

WHEREAS, Hasty or inexperienced action may easily result in the depletion of natural resources which cannot be restored within a long period of years; and,

WHEREAS, In the staff of the United States Bureau of Fisheries, and in the trained experts of the State Bureaus, Commissions, and Hatcheries, the country is possessed of a body of highly trained men devoted to the needs of the nation as a whole and qualified to speak on special problems of fisheries in the war with the knowledge and experience that will guard against the evident danger of hasty action; and,

WHEREAS, proposals have been made to suspend or revoke laws for the regulation of fisheries which have grown out of long experience and careful study of conditions regarding the habits, growth, and multiplication of fish on the one hand, and the practical conditions of the fishing industries on the other hand; and,

WHEREAS, The shad, striped bass, and other anadromous species have decreased in some rivers almost to the point of extinction, because of fishing devices operated in the salt and brackish waters through which they must pass to reach their natural spawning grounds in fresh water; and,

WHEREAS, Artificial propagation of these species is impossible and natural reproduction is prevented unless a reasonable supply of such fishes is allowed to reach their natural spawning grounds in fresh waters; therefore,

Be It Resolved, That the expression "letting down the bars" as applied to the fishery resources of the country is unfortunate; national welfare demands the greatest development of the said fisheries, including fish culture and the artificial propagation of food fishes to the highest possible point of efficiency;

Resolved, That commercialization of the so-called game fishes is not conducive to their proper conservation but would tend to destroy a limited but valuable food product—the annual catch under present restrictive laws, aided by artificial propagation, being barely sufficient to maintain a reasonable annual supply;

Resolved, That the taking of non-game food fishes, under proper supervision, be encouraged in every legitimate manner consistent with the preservation of a sufficient breeding stock to insure a future normal crop, (in states where required, necessary legislation to this end should be enacted);

That many waters in which the so-called game fishes predominate contain also rough fish such as carp, suckers, bowfin, gars, etc., and in such waters the removal of these non-game fishes will be beneficial to angling, and a limited amount of commercial fishing, under proper regulation, should be encouraged;

Resolved, That the anadromous fishes should be permitted to ascend the rivers from the ocean in sufficient numbers to maintain a constant and normal supply, and that to this extent the commercial fishing should be subject to proper regulation; and,

Be It Resolved, That a solution of this problem relating to the alarming decrease of these species rests in the Federal control of all anadromous fishes; and,

Be It Further Resolved, That a copy of these resolutions be forwarded to the Bureau of Fisheries, the United States Food Administration, and the fisheries authorities of the various states.

(Signed) JOHN W. TITCOMB, *Chairman*.

President Field then introduced the incoming President, Mr. O'Malley, who spoke very briefly.

On motion by Mr. John P. Woods, the Society expressed its appreciation of the work of President Field by rising, after which it formally adjourned.

EDITORIAL.

The Next Annual Meeting. The Forty-eighth Annual Meeting of the American Fisheries Society will be held in the State of New York on September 9, 10 and 11, 1918. The exact place of meeting has not yet been determined but will be announced later. There has been considerable discussion in the various scientific societies as to the propriety of holding meetings under present conditions of travel and railway congestion. While it may be advisable for certain societies to forego their meetings, it seems to the writer that there never has been a time in the history of this Society when a full attendance at the regular meeting was more desirable. A very large percentage of our membership consists of men who are interested in the practical and economic phases of fisheries work; and conservation, greater utilization of fish, especially the cheaper kinds, the increased use of by-products, greater production, improved methods of marketing, etc., are matters which concern the welfare of the whole nation, now and in the future. Keep the date of the meeting in mind and be fully prepared for the discussion of these and other important problems of wide application.

* * *

Fresh-water Biology. By Ward and Whipple.—A Review.

The members of the American Fisheries Society will all be interested to learn that a most important publication bearing the above title has just made its appearance from the press of John Wiley and Sons, New York. The responsible authors, Dr. Henry Baldwin Ward, Professor of Zoology in the University of Illinois and Dr. Geo. Henry Whipple, Professor of Sanitary Engineering in Harvard University and Massachusetts Institute of Technology, have been aided by a staff of twenty-five specialists in the various groups of fresh water organisms. The amount of material embraced in the volume of over eleven hundred pages is stupendous, and only the enlistment of a large corps of able specialists could ensure such satisfactory and authoritative results.

The work has been under way for many years and it seemed to some of us as though it never would make its appearance, but the long awaited results are not in the least disappointing. To be sure, one may pick flaws here and there, but where lives the scientist who was ever quite satisfied with another's work?

Following the introduction by Ward, are excellent chapters dealing with the conditions of existence in fresh water, by V. E. Shelford, and methods of collecting and photographing, by Jacob Reighard. The Bacteria are treated by E. O. Jordan, the Algæ by E. W. Olive and Julia W. Snow, and the larger aquatic plants by Raymond H. Pond. The treatment of the various zoological groups from the Protozoa to the aquatic vertebrates—the work of numerous specialists—occupies more than three-fourths of the book. A chapter on sanitary and technical problems, by Whipple, closes the volume.

From the standpoint of one interested in fish culture it seems regrettable that a key to the commoner forms of the higher plants that are fully aquatic, such for instance as the pond weeds, was not included, but there are numerous good works on systematic botany which may readily be obtained. One misses also any reference to the Sporozoa, the Protozoan forms so commonly parasitic on fishes, but this was probably conditioned by the inability to find any specialist to undertake this little-known group. No synoptic treatment of the fresh-water vertebrates is attempted, owing to limitations of space; but systematic works on the fishes, amphibia and reptiles are easily available in other literature, and Prof. Eigenmann's general discussion is interesting and valuable.

The chapters dealing with the animal groups most closely related to the economy of fishes, either as parasites, or as food, are all well done. For the first time in the history of American zoology do we find a comprehensive discussion of the parasitic flat worms and round worms. The biological interest in these groups is necessarily very great and their economic importance can scarcely be overestimated; but, owing to the scattered nature of the literature, it has been exceedingly difficult to do satisfactory work on them. Professor Ward's complete and authoritative treatment of these groups is therefore of special

value. The leeches are discussed in a very satisfactory manner by Dr. J. Percy Moore. The very full treatment of the wheel animalcules or rotifers, by Prof. H. S. Jennings, is a delight to the zoologist. The numerous smaller Crustacea, so important as fish food and in some cases as parasites, are handled by well known specialists, A. S. Pearse (Phyllopoda), E. A. Birge (Cladocera), C. Dwight Marsh (Copepoda), and R. W. Sharpe (Ostracoda). Of the chapter on the higher crustaceans it is sufficient to say that it is the work of Dr. E. A. Ortmann. The aquatic insects and mollusca are so numerous that a volume would be required for the full discussion of either group, yet Prof. Jas. G. Needham has accomplished a great deal in the seventy pages allotted to the former group, and Dr. Bryant Walker has also done much with the mollusca, considering the limited space.

It must be borne in mind that this is not merely a systematic work, but that much space is devoted to ecological and economic aspects of the various forms, to life histories and other general biological considerations.

The whole volume is profusely illustrated, and all the cuts are new and drawn from specimens. Keys are provided in all groups except the higher plants and the vertebrates, and the most important reference works on each group are cited in a literature list at the end of each chapter. The index is very complete.

As stated in the author's preface this is the first attempt "to deal with North American fresh-water life in its entirety." While such a work is necessarily incomplete, even in a large volume, there is great value in the accumulation of such a mass of material from scattered sources, as it is thus rendered available for the general worker as well as for the specialist. Fisheries men and other individual workers interested in the life of the fresh waters of North America will all welcome this volume, and for the colleges and aquatic laboratories it will be a necessity.

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